

CLAIMS

1. An image pickup device comprising:

a semiconductor substrate having a back surface, serving as a light-incident surface, and a front surface, opposing the back surface and being provided with a charge reading part constituted by a charge coupled device that detects light propagating from the back surface; and

a fiber optic plate having a light outgoing end surface joined to the back surface of said semiconductor substrate.

2. An image pickup device according to claim 1, wherein the light outgoing end surface of said fiber optic plate is joined to a part of the back surface of the semiconductor substrate that corresponds to a region at which said charge reading part is disposed.

3. An image pickup device according to claim 1, wherein said semiconductor substrate has a structure such that the thickness of the region at which said charge reading part is disposed is made thinner than the thickness of the remaining region, and

wherein the light outgoing end surface of said fiber optic plate is joined to the part of said semiconductor substrate that is made thin in thickness.

4. An image pickup device according to claim 1, wherein a protective plate is joined to the front surface of said semiconductor substrate so as to cover said charge reading part.

5. An image pickup device comprising:

5 a semiconductor substrate having a back surface, serving as a light-incident surface, and a front surface, opposing the back surface and being provided with a charge reading part constituted by a charge coupled device that detects light propagating from the back surface, said semiconductor substrate having a structure such that the thickness of the region at which said charge reading part is disposed is made thinner than the thickness of the remaining region;

10

a package having a cavity that houses said semiconductor substrate and that is fixed with said semiconductor substrate while the front surface of said semiconductor substrate faces a bottom part of said cavity;

15 a fiber optic plate having a light outgoing end surface joined to the back surface of said semiconductor substrate while at least a part thereof is housed in said cavity of said package;

20 a cover covering an upper opening of said cavity of said package, said cover having a guiding opening for inserting at least the part of said fiber optic plate into said cavity; and

25 electrical wirings for taking out charge signals output from said charge reading part to the exterior of said package, said electrical wirings including substrate-side electrodes disposed on the front surface of said

semiconductor substrate, package-side wirings disposed on the bottom surface of said cavity and being electrically connected to said substrate-side electrodes via bumps disposed on said substrate-side electrodes, and package-side electrodes disposed on an inner wall of said cavity and being electrically connected to said package-side wirings by bonding wires.

6. An image pickup device comprising:

a semiconductor substrate having a back surface, serving as a light-incident surface, and a front surface, opposing the back surface and being provided with a charge reading part constituted by a charge coupled device that detects light propagating from the back surface, said semiconductor substrate having a structure such that the thickness of the region at which said charge reading part is disposed is made thinner than the thickness of the remaining region;

a package having a cavity that houses said semiconductor substrate and having one surface whose opening portion is covered by a bottom cover, and the other surface opposing said one surface and whose opening portion is attached with a guide member having a guiding opening, said package being fixed with said semiconductor substrate such that said charge reading part and said bottom cover face each other while said semiconductor substrate is housed;

a fiber optic plate having at least a part housed in

said cavity of said package via the guiding opening of said guide member, said fiber optic plate having a light outgoing end surface thereof being joined to the region of the back surface of said semiconductor substrate that is thin in thickness; and

5 electrical wirings for taking out charge signals output from said charge reading part to the exterior of said package, said electrical wirings including substrate-side electrodes disposed on the front surface of said semiconductor substrate, and package-side electrodes
10 disposed on an inner wall of said package and being electrically connected to said substrate-side electrodes by bonding wires.

7. A method of manufacturing an image pickup device,
15 comprising the steps of:

preparing a semiconductor substrate having a back surface, serving as a light-incident surface, and a front surface, opposing the back surface and being provided with a charge reading part constituted by a charge coupled device
20 that detects light propagating from the back surface;

preparing a fiber optic plate; and

joining a light outgoing end surface of said fiber optic plate to the back surface of said semiconductor substrate.